ABSTRACT

Discontinuous diamond particulate containing metal matrix composites of high thermal conductivity and methods for producing these composites are provided. The manufacturing method includes producing a thin reaction formed and diffusion bonded functionally graded interactive SiC surface layer on diamond particles. The interactive surface converted SiC coated diamond particles are then disposed into a mold and between the particles and permitted to rapidly solidify under pressure. The surface conversion interactive SiC coating on the diamond particles achieves minimal interface thermal resistance with the metal matrix which translates into good mechanical strength and stiffness of the composites and facilitates near theoretical thermal conductivity levels to be attained in the composite. Secondary working of the diamond metal composite can be performed for producing thin sheet product.